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INDUSTRY AND KENNAMETAL ...Partners in Progress

EDITOR
Martin Caidin

PUBLISHER
Murray Queen Smith

APRIL 1959

MAGAZINE LAYOUT
Barbara Dodd

CIRCULATION AND SERVICE
Helen Rodin

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OUR COVER

First full scale model of the "Aerodyne," a radical wingless VTOL Aerial vehicle incorporating a new philosophy in aircraft design, is shown with its designer, Dr. Alexander Lippisch, during a "roll-out" at Collins Radio Company's Aeronautics Research laboratories, Cedar Rapids, Iowa. The joint Army-Navy developed aircraft achieves vertical take-off and landing capabilities, and transition to and from forward flight, by channeling the airflow, or thrust, from its two contra-rotating propellers internally through the crafts's fuselage, and deflecting it downward and out through controllable vents in its belly. This propulsion method eliminates the need for wings.

2ND CLASS POSTAGE PAID AT WASHINGTON, D.C.

EDITORIAL
by Martin Caidin

NORAD: EXPOSING SOME STRAINED U.S.-CANADIAN RELATIONS

In 1938, President Roosevelt and Prime Minister Mackenzie King declared that neither country would stand by for attack upon the other — a commendable expression of mutual defense between Canada and the United States.

This was more than two decades ago, and while remembering highlights of history its somewhat difficult to recall other news-making events of the day that relate to the same problem; while the two national leaders decided publicly that their nations would assist one another in time of martial need, Eddie Cantor was advising King George VI that he should '...put Canada in his wife's name,' as it was pretty obvious that Hitler had designs on Europe and anywhere else he could go and hold.

From this beginning of intimate defense thinking between the United States and its northern neighbor, there has been a fast growing assumption on both sides of the border that in this era of modern weaponry, particularly with the possibilities of attack either through the atmospheric envelope of the earth or the space above it, that true air defense is surely a continental, and likely a global problem.

Canada strains politically to the idea that the North American Air Defense Command is an extension of NATO, while the United States shudders at this pretension. Militarily and politically, the United States feels this is an utterly silly idea, and expresses serious concern each time that Prime Minister John Diefenbaker publicly eschews the matter. For a long time, Diefenbaker stuck to his line of relationship with the NATO structure . . . despite the fact that NATO's Secretary General Paul Henri-Spaak repudiated him within hours after he had made this declaration in the Canadian parliament. Spaak ignored Diefenbaker's convictions, and said the U.S.-Canadian partnership in air defense absolutely had no direct or indirect tie-in to NATO.

The reason is probably that to a politician, NATO is sold, it has been government policy for more than ten years (which means Diefenbaker's opposition instigated NATO, and if he can make NORAD an extension of NATO, then politically both sides of the Parliament assemblage is on the hook with it).

The development which became NORAD started as a Canadian-U.S. Regional Planning

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Group, whose existence was admitted in the NATO relationships. Originally, this fell into the easy reading initials of CUSAD (Canadian U.S. Air Defense), and the assignment of the Commander in Chief would have created a CINC-CUSAD (or as those who worked with this matter and had the frowning Canadian politicos looking over their shoulders for any move which might mean annexation of Canada, CINC CUSSED).

The last set of initials before NORAD was formalized into the short version was ADCANUS Air Defense Canada and United States. Somebody pointed out to the Canadian Chiefs of Staff Committee (the 'somebody'was General Earl E. Partridge) and to the U. S. Joint Chiefs of Staff that there was considerable headline familiarity with ADC as the short term for Air Defense Commands, and if the headline writers were to make a crucial seperation, it would be possible that they would then see themselves in print as ADC ANUS. Now, General Partridge understandably did not look with joy upon the prospect of being in that position in relation to ADC . . . after which it became NORAD, and still is.

The treaty agreements setting up NORAD came to signature and announcement stage on 1 August 1957; a dual announcement in the United States and in Canada.

Before all this, there has been this progression:

(1) The Pinetree Radar Line along southern Canada, but north of the border, had gone in, built largely with American money according to Canadian (RCAF) specifications, initially manned by the U.S. but 'ultimately to be manned by the RCAF'.

(2) The DEW line had gone in across the Canadian Arctic, more than 50 individual sites, built with US money, initially manned by USAF airmen and civilians, recently largely taken over by Canadians because of sovereignty complaints that it was necessary to clear Canadian nationals, yes even Government officials, with US commanders before they could visit Canadian soil.

This was largely because of the requirements to provide rations, shelter, etc., and the Arctic sites were meager in this regard. Nonetheless, it became a hot-blooded political issue, and became the focus of a roaring controversey in Canada.

(3) Canada allocated nine squadrons of its RCAF to NORAD's operational control, retained tight national clutch on the units, became very precise in definitions of the difference between 'command' and 'operational command.' -- the former being something they would switch to in time of war, the latter to be retained in peacetime (which rather denied the crucial project of deterrence, and accepted the inevitability of war).

(4) Under NORAD, one of the eight or nine geographical regions of defense will be the Northern NORAD Region at St. Hubert Quebec which will be bossed by an RCAF Air Vice Marshal (equivalent to rank of Major General), who will have an integrated staff of USAF and RCAF officers. When Canada agreed to this, they also admonished NORAD that the more than a dozen USAF officers involved initially would come to Canada as 'liaison officers in civilian clothes'. The implications were that this would be of politically dangerous import to indicate a U.S. infiltration (contrarily, in the case of NORAD's Headquarters in Colorado Springs, the U.S. elements pleaded for a long time and eventually got an Air Marshall, C. Roy Slemon, and an Air Vice Marshall, Keith Hodson, and an eighty-man increment to the staff; it was an obvious move to lean over backwards to consider Canadian interests, to heed Canadian counsel).

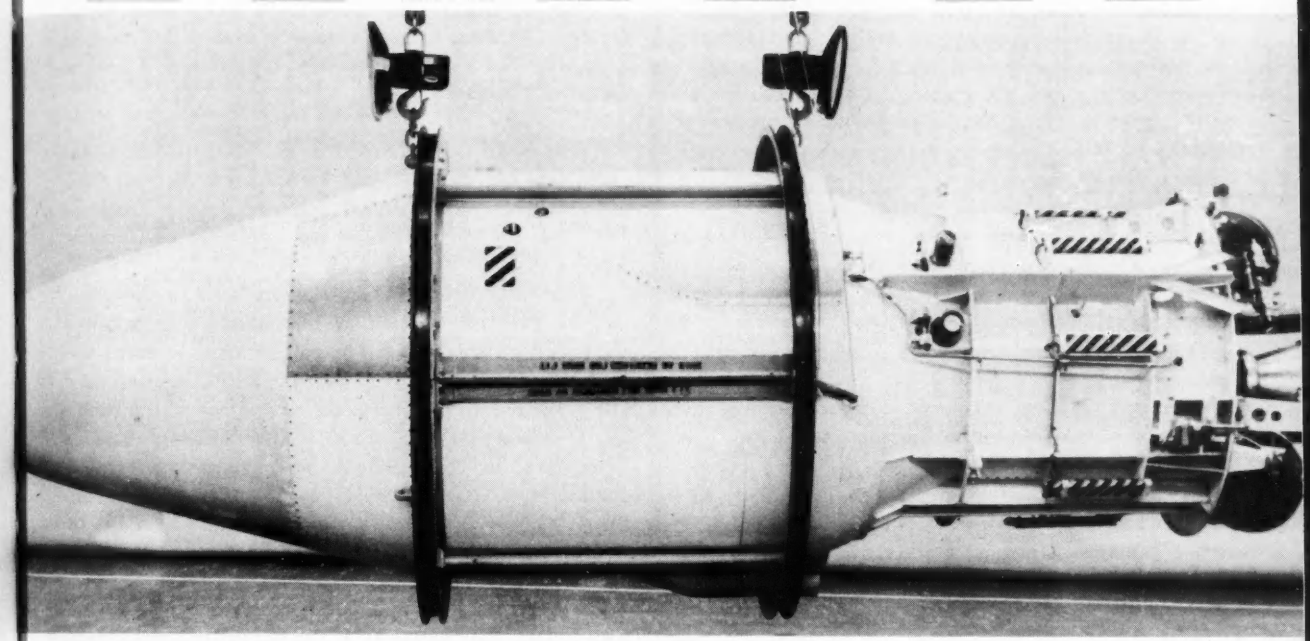
(5) When General Partridge was named as Commander in Chief, NORAD, he was held back from visiting Canada for some time by the Diefenbaker government, and when he was finally permitted to come in for purposes of protocol, paying respects visits, he was timed by the Canadians to arrive around ten P.M., was told he could not be met by the press, and that he would give no press conferences. This was in glaring contrast to the treatment accorded Americans like Eisenhower, Gruenther, and Norstad who had similar relationships to Canadian elements in NATO.

To this date General Partridge has never been permitted a press conference in Canada, although he has been there several times. He met the Canadian press only once, at Headquarters NORAD, when last November the government finally permitted a press trip into the U.S. for this purpose.

All is not so rosy in the northland. ●

(Information for this editorial was submitted to DATA practically verbatim by a ranking officer assigned to NORAD who asked us to withhold his name from publication.)

ARPA Up to Date



***Details of satellite** and propulsion package of Discoverer program are revealed clearly in this photograph. Final weight in orbit of Discoverer was 1,300 pounds, including propulsion unit and satellite package. One Discoverer per month is schedule as it now stands; payloads will include animals.*

The Advanced Research Projects Agency (ARPA) was established to plan and direct advanced research projects vital to our national security.

ARPA has broad latitude in the means by which it can accomplish the performance of its many and varied scientific and technical projects. Its charter permits performance of ARPA projects by military departments, other Government agencies, individuals, private business entities or educational and research institutions. ARPA can acquire or construct such research, development, and test facilities and equipment as are required to carry out its assignments. These alternative methods of operation are required because of the urgency, importance, and unique and dynamic nature of ARPA's assigned programs.

To date, ARPA has been performing its work by assigning its projects to one of the service organizations and, in a few cases, to other Government agencies for execution either directly or on behalf of ARPA. For effectiveness and efficiency of operation, the projects are assigned to the lowest organizational echelon capable of performing the work. By that I mean the organizational unit which has the necessary facilities, personnel, and contractual and other delegated administrative authorities to do a complete project for ARPA. For example, rather than assigning all projects to the Secretary of a Department which, in turn, would have to select and assign it to lower levels within the Department, ARPA directly assigns the work to lower organizations such as the Air Research and Development Command in the Air Force, the Army Ordnance Missile Command and the Chief Signal Officer in

by REAR ADMIRAL JOHN E. CLARK

the Army, the Bureau of Ordnance and the Office of Naval Research in the Navy, and the National Bureau of Standards in the Department of Commerce. The secretary of the Department concerned and the Joint Chiefs of Staff are concurrently advised of the project work at the time of assignment. This procedure has proved to be most effective and expeditious.

ARPA has not established separate detailed administrative policies and procedures which it requires each agency to follow in the performance of the work. When ARPA assigns its work, it generally relies on whatever policies and procedures that Department follows in its own activities. In all cases, however, ARPA reserves to it the broad program management of the project with the agency performing only the detailed supervision of the work.

Projects assigned follow two broad categories: In-house work, or contract work. If it is contract work, then the agency acts as ARPA's contracting agency and solicits, evaluates, and selects the contractor, and prepares and administers the contract. In special cases, ARPA solicits, evaluates, and selects the contractor and, in turn, requests an agency to negotiate, prepare, and administer the contract for ARPA.

Since its inception on 12 February 1958, ARPA has generated the major portion of our present national space program. The major activities that were transferred to the National Aeronautics and Space Administration by Presidential Order and in accordance with the provisions of the National Aeronautics and Space Act of 1958 (P. L. 85-568) were (1) scientific space programs within the IGY consisting of lunar probes and the Vanguard Program, (2) development of a one and one-half million pound single engine booster and (3) studies of the man-in-space effort. These were transferred to the NASA between the period 1 October to 31 December 1958.

In addition, ARPA has pursued the development of a high energy rocket known as CENTAUR, which is scheduled for transfer to NASA on 30 June 1959. CENTAUR is being developed by ARPA to complement the one and one-half million pound clustered booster for providing a capability of putting heavy satellites in orbit, especially for communications payload and others now in a stage of development that will orbit for long periods of time and carry adequate secondary power supplies. A second development within ARPA scheduled for transfer to NASA on 30 June 1959 is the cloud cover satellite.

Example of two current efforts being conducted jointly by ARPA and NASA are the development of a national tracking program and a national space vehicle program. It is considered desirable in the case of either of these programs not to delegate the responsibilities of each to a single agency because of the nature of the separate requirements and the facilities that are peculiar to both military and civilian scientific agencies.

Our relations with NASA have been most satisfactory. We meet with this Agency frequently, often on a day-to-day basis at both the administrative and the technical levels.

The National Aeronautics and Space Council was established by the National Aeronautics and Space Act of 1958. The Space Council is chaired by the President The DoD representative is the Secretary of Defense.

The activities of ARPA as related to the NASC include (1) presentation of information and briefings on space programs vital to our national interest that should be submitted to the highest administrative level and (2) requests for decisions on matters which cannot be resolved through the Civilian/Military Liaison Committee and thus require Presidential approval to conduct the national space program. Examples of information and briefings submitted to this Council are the National Tracking Program, the National Space Vehicle Program, the Fiscal Year 1960 Space Program, International Cooperation Activities, the Reconnaissance Satellite Program, and frequent review and recommendations where deemed appropriate for the management of the national space program.

The above developments originated by ARPA and scheduled for transfer as well as those pursued jointly are examples of the items which are within the functional framework of the CMCL-that is, to discuss the nature of each effort and where the responsibility should remain for certain programs that have mutual military and civilian scientific interests.

The CMLC is authorized by the Space Act (P. L. 85-568) as a medium through which the DOD and the NASA shall advise and consult with each other on matters within their respective jurisdictions.

The correlation of both military and civilian scientific activities described above, between ARPA and NASA, and through NASC and CMLC, is taking place smoothly and satisfactorily.

Ordinarily projects assigned to ARPA will fall into one or more of three categories: (1) those which, by virtue of their advanced nature, cannot be identified within the stated military mission of an individual military department; (2) those for which a military mission can be identified as being of interest to more than one of the military departments; and (3) those which, for various reasons, must be pursued by an agency not subordinate to one or more of the military departments.

Military research and development has, we believe, been hampered in the past by the requirement that funds be allocated to research only when the product could be immediately identified with a weapons system. ARPA does not have this limitation.

This means that for the first time the Defense Department is prepared to sponsor pure research against the judgment that it might lead to a valid military application, without proving the judgment in advance. The pace of scientific progress is undoubtedly one of the distinguishing features of this century. As it applies to the military, the President has clearly stated the fact that the days of wholly independent ground, naval, and air forces are gone. There can be no doubt but that many present development projects and many of those to come will have application to more than one of the military departments. This is certainly true of Ballistic Missile Defense, as an example.

Research in such areas must take the fullest advantage of all our U. S. capabilities. It cannot be limited to a portion of our laboratory skill that happens to be employed by a single service or a single company. Since we cannot, and should not, deprive ourselves of the traditional value of military decentralization, we must achieve effective management at a higher level if we are to take advantage of all the skills and resources available.

The history of American Technological accomplishments and the day to day progress evident on all sides is eloquent testimony to the high level of scientific and engineering capability in this country. The problems of advancing and accelerating our technological position are not problems associated with a paucity of talent - at the present time we are loaded with brilliant scientists and engineers. The problem is how to organize it - how to bring the full weight of the potential to bear, eliminating power losses from duplication, from lack of complementary effort wherein the total is greater than the sum of its parts, and from effort wasted in satisfying special interests and politics. These organizational problems and the underlying subversive influences should be the concern of all, for it is in this area that we can make our greatest contributions to advancement. Unfortunately, it is an area that seems to require a minimum of understanding in order to become an expert.

I have talked at some length about our present organization and programs. Now there is the general question of the desirability or undesirability of a centralization of all effort in space technology into one agency, department, or commission. There is much to be said on both sides and I do not propose to present you a blueprint here. Rather, I wish simply to stimulate serious thought on the subject, with the hope that those who have an urge to espouse a cause do so not instinctively or with half the story or for political reasons, but because the matter has been given deep and penetrating scrutiny and sincere convictions supportable by fact and example have resulted therefrom. ●

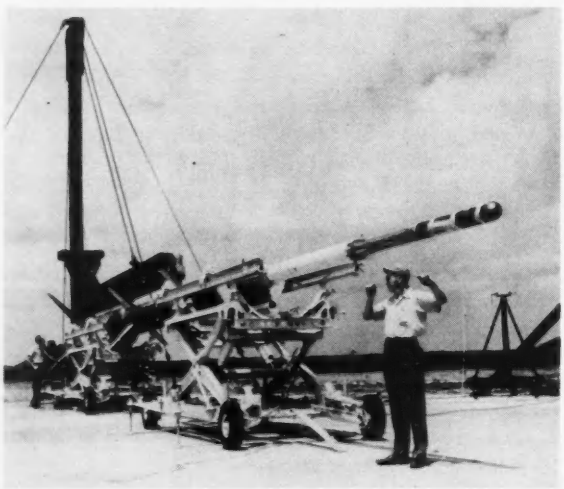
RADM John E. Clark, USN, Deputy Director, Advanced Research Projects Agency, graduated from the US Naval Academy in 1927. In 1931 he was designated a Naval Aviator and thereafter served with many squadrons both ashore and afloat. During WW II he served with distinction as an air squadron commander and on various staffs in the Pacific. In 1945 he attended instruction at the Army Air Force School of Applied Tactics, Command and General Staff School, Naval War College, and the Army-Navy Staff College. Later in 1945 he took command of the USS CURRITUCK (AV-7). In 1947 he reported as Chief of Air Objectives Section, DCNO (Air). From here he served on several more staffs and had command of the USS WRIGHT. In August 1955 he attained the rank of Rear Admiral and in November was assigned duty as Director of the Guided Missiles Division, CNO. In March 1958 he was ordered to his present assignment.

COMMENTS BY
THE EDITOR:

ANOTHER LOOK AT ARPA

There's one sure proof that the Space Age is really with us. New satellite launchings, unless something extraordinary is involved, not only don't make the headlines. . . they rarely make the front page.

After a torrent of Monday morning quarterbacking, the United States is settling down to a solid foundation of astronautics — or aerospace, if you will — research, development, testing, and accomplishment. From the clouds of steam that enveloped the nation's capital during investigating sessions, two major groups evolved — NASA and ARPA. During the earlier days of these two organizations the air crackled from conflicting interest, questionable areas of command, and the under-the-table conflict for specific authority and responsibility.



***The Aerolab ARGO E-5** research missile on the launcher at NASA Space Vehicle Test Station, Wallops Island, Va. The ARGO E-5 was used by Aerolab in a prime contract to the Air Force Special Weapons Center, Kirtland Air Force Base, on Project Jason, connected with the recent "over the atmosphere" atomic shoots on Project ARGUS.*

Much of this is now behind us. Both ARPA and NASA, for the greatest part, have thrown their energies into their respective, and their mutual areas of research. Results are beginning to show. Carefully avoiding being stampeded or pressured into projects that would make headlines, but which might seriously disrupt their crucial work, both ARPA and NASA are building a powerful bridge into the future.

The greatest news to American military-scientific projects — and an indication of its future — was the appointment of George Sutton as the chief scientist of ARPA. This is worth cheering about, for ARPA has a man not only of imagination and extraordinary talent, but a scientist with a staggering and exhaustive background in the history, development, programming, use, and future development of powerful rocket systems. Sutton has been in this game from the ground up, and as ARPA's chief scientist, he promises to bring a combination of foresight and talent to ARPA that will be of inestimable aid to our military aerospace future.

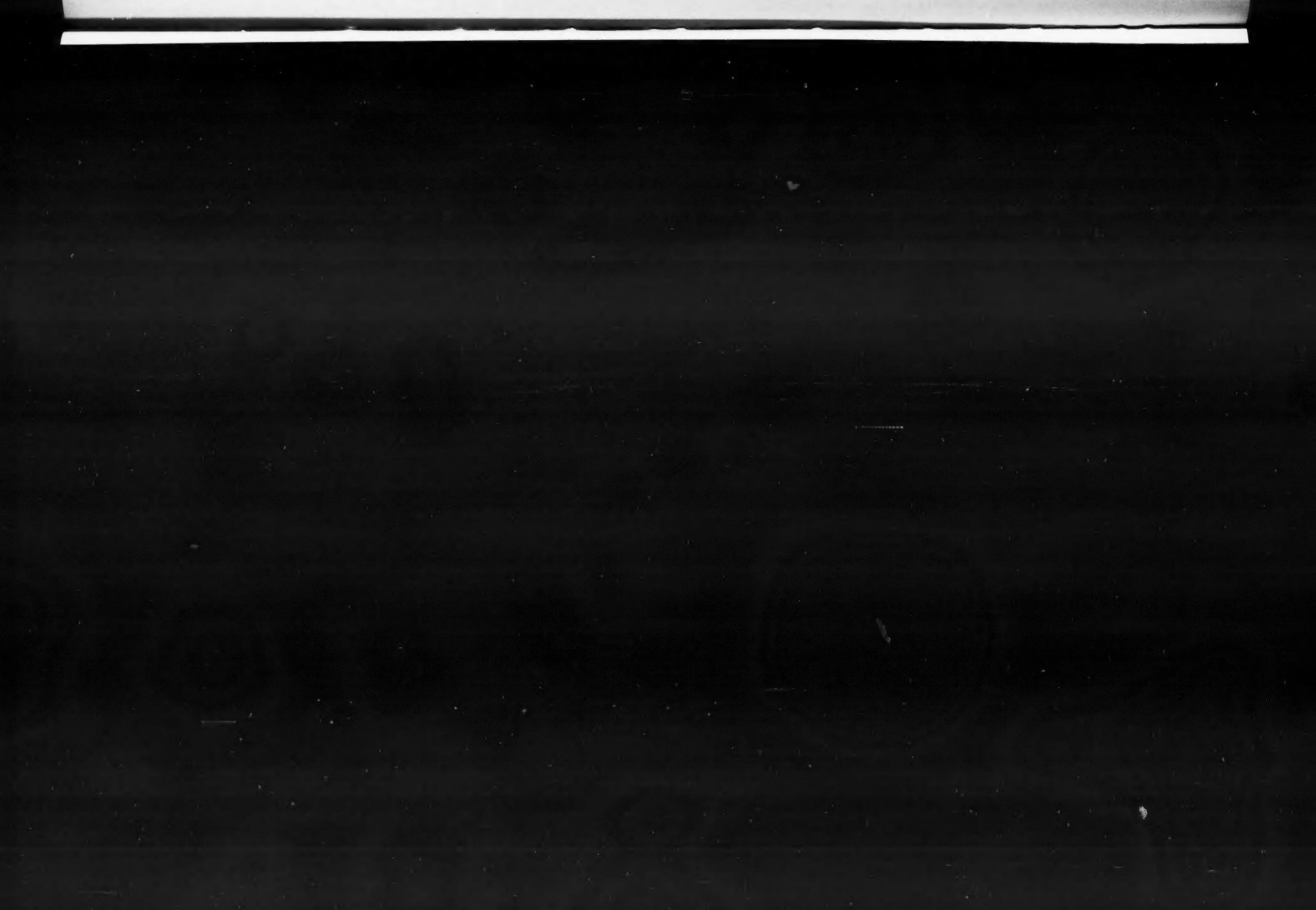
This writer believes that ARPA has been passed over by many reporters bringing to the country the latest space developments.

And I can't help but add the conviction that this is just the way ARPA wants it to be. ARPA is in the arena with the USSR where it counts — military development of space power, and they must succeed.

The work they are doing — SCORE, DISCOVERER, SENTRY, MIDAS, and many more projects still under the label of secret — are vitally important to the United States. From all that can be learned, ARPA's scientists and engineers (despite normal problems of overlapping jurisdiction with other groups) are forging very substantial gains in their program to give the United States a powerful military capability in space. When DYNASOAR reaches its flight-testing stage, there will be many headlines. But DYNASOAR is just an example. When flight tests begin, there will have been a mountain of relatively unpublicized and back-breaking work already done.

In the large missiles and space fields, the United States has behind it a sad record of political blindness and stumbling that could have cost us dearly.

Now, with ARPA, as well as its contemporary in NASA, seems to be taking the proper steps to put the United States back where it belongs — well out in front. ●



DEADLINE DATA

JAMES TO BE NEW BUSHIPS HEAD

R/Adm R.K. James will succeed retiring R/Adm Mumma as Chief of Navy's BuShips before May. ///DATA/

NAA EXPANDS TO ELEC AND MARINE EQUIP

North American Aviation plans to acquire Forest Wheeler Corp, combining NAA's a/c interests with FW's engr, constr, elec and ship equipment interests. ///NAA 4-59/

RED BOMBER RUMORED TWICE AS FAST AS U.S. B-52

A 6-jet, delta wing, intercontinental bomber able to travel at Mach 2 is credited to USSR's operational service. Fastest US bomber in regular service is the 8-jet B-52, traveling at Mach 1 (US B-58 has reached Mach 2, but is not in operational service). ///Army Times 4-59/

NO CHANGES SEEN WITH ANDERSON HEADING AMC

With Lt Gen Sam Anderson, former ARDC C.O., now heading Air Materiel Command, prospects for change are slight. Weapons Sys concept will remain, R&D limited-run contracts will remain, biz continuing to slide toward large firms because of efficiency of having more under 1 roof.

NORAD COMBAT OPS CENTER TO BE NEAR COLORADO SPRINGS

Site in Cheyenne Mountain area near Colorado Springs, Colo., has been approved as location for North American Air Defense (NORAD) Combat Ops Center. Dept Defense FY 1960 Mil Construct Auth Bill contains $10 million item for this facility.

COAST-TO-COAST NETWORK TRACKS SILENT US & USSR SATELLITES

Satellites without radio beacons can now be traced by 2 experimental sys under ARPA. One sys, by Army Ballistics Res Lab, uses doppler tracking; the other, NRL's SPASUR (space surveillance), uses interferometer techniques. SPASUR stations, completed Jan'59, send fan-shaped radiation waves which reflect from satellite to receiver stations. SPASUR consists of 6 stations extending across south US. Doppler extends from Memphis, Tenn to White Sands, N. Mex.

BALD BIRD AIDS MAN'S STUDY OF HAIR LOSS

All you bald-headed executives, take heart. You have not been forgotten in this missile age. At the State Univ of NY in Brooklyn, Dr. James B. Hamilton of the dept of anatomy has been conducting tests with a bird, the wattled starling, that frequently loses feathers from its head in the same manner as the balding process in man. This bird may provide 1st controlled experiments on balding. The time may not be distant when, even if we can't bring back hair, we can cover bald heads with feathers.

CONGRESS SEES LOOPHOLES IN PROCUREMENT LAWS

Congress continues its latest drive to revamp procurement; prods Pent for more advertised, sealed bidding and small-firm contracts.

DOD & INDUSTRY ADOPT UNIFORM ENGR SPECIFICATION

Defense Dept & industry have adopted a uniform spec (MIL-D-70327) for procurement of engr drawings, as part of long-range program for interchange of engr data between mil depts and contractors. Copies avail thru military contracting officers. ///DOD 406-59/

LIGHTWEIGHT STEAM ENGINE

Lightweight steam engine for use in Navy 28-ft personnel boats is under eval by Navy. Engine dvlps over 200 hp, does not require transmission, clutch or reverse gear, but drives propeller directly. New engine has more favorable wt-to-hp ratio than diesels. ///Mil Review 0401/

NASA AWARDS LIQUID HYDROGEN CONTRACT TO LINDE CO

NASA awarded Linde Co, div of Union Carbide, a 5-yr contract for West Coast purchases of liquid hydrogen. The plant, to be located in Torrance, Calif, is to fill NASA's expanding needs for liquid hydrogen in work on several rocket projs in Southwest. ///NASA 0403/

CHICOM TRADE WITH USSR INCREASES

In 1958 Chinese-Soviet trade increased appx 18% over that of previous yr. ChiCom exports to USSR were up 23%, while imports from USSR increased by 12%. According to Soviet figures, in 1957 ChiComs exported appx 3/4 of a billion dollars worth of agricultural items, minerals and fabrics to the USSR, and imported abt half billion dollars worth of mfg goods and equip. Abt 40 to 50% of ChiCom foreign trade is with USSR.///Reuters 0403/

CHICOM AIRPOWER

Chinese Communist AF consists of appx 3000 a/c of which appx 1500 are MIG-15 FAGOTS, MIG-17 FRECOS, and a few MIG-19 FARMERS. It has appx 300 piston engine fighters of LA-9 FRITZ and LA-11 FANG type. Appx 300 IL-28 BEAGLE light jet bombers and some 400 TU-2 BAT a/c and TU-4 BULL propeller-driven bombers also are reported. Transport a/c in ChiCom AF total abt 300, mostly IL-12 COACHES. North Korean air arm, closely allied to Red China, is reported to have 400 mil a/c, most of which are MIG-15 FAGOTS. ///Nav Av News 05/

SOVIET SATELLITE MISSILE BASES

The following Soviet missile bases in satellite nations have been reported: East Germany—Kolberg, Libau, Memel, Reval; Hungary—Hajmasker, Papa, Tapolca; Czechoslovakia—Karlsbad, Joachimsthal, Bohmen-Budweis, Javorina, southwest of Reichenberg, northeast of Olmutz.

UAR GIVES MILITARY TRAINING TO UNIVERSITY STUDENTS

UAR institutes compulsory mil training in its 5 univs, with total enrollment of 10,000. Outstanding mil students exempted from paying tuition.

NEW MISSILES

ARCON, expected to aid in predicting flight vibration conditions of FBM POLARIS, is 12 ft long and 6 in. in dia. It can carry 40-lb payload to a height of 70 mi, or 10-lb payload to 100 mi. IRIS, research rocket designed to carry 100-lb payload to alt of 200 mi, will see test this yr. ARCAS, research rocket designed for low acceleration rate and use in upper atmosphere research. Low acceleration is built in to reduce need and expense of ruggedizing instrumentation. GIMLET is air-launched, 5-in. dia, folding-fin rocket on order by Navy. GIMLET will be solid propelled. EAGLE, Navy missile still highly classified, is air-to-air bird expected to supplant SIDEWINDER and SPARROW. EAGLE is said to be extremely fast, with better guidance than SIDEWINDER or SPARROW. Bendix and Grumman teaming on EAGLE. RASCAL GAM-63 has rcvd coup de grace from AF. No more orders will be placed for this 75-mi air-to-ground bird. ///DATA/

SOLAR AIRCRAFT HAS ANTI-MISSILE PROJ

Solar a/c has rcvd study contr from Army Ord in field of anti-missile defense, in accord with ARPA. The contract is classified but it is known that Solar rcvd contract because of new approach to defense from ICBM attack. Contract price was not given. ///DATA/

MILITARY TRANSPORT PROPOSALS TO ARDC STILL PENDING

The 7 proposals, made last month to ARDC, for supersonic mil transport study contracts are still awaiting acceptance. Companies include Convair, Boeing, Lockheed, Douglas and North Am Av, which proposes a mil transport version of the Mach 3 B-70. Commercial transport configuration for Mach 3 may be next. ///DATA/

UNDERGROUND USSR MOON COMMUNITIES PLANNED; MARS, VENUS NEXT

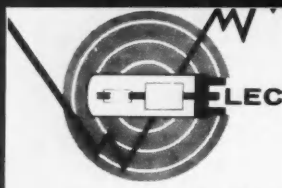
Plans for temporary lunar tents & perm underground moon communities are outlined in new Soviet book, Sputniks and After. From Sputnik info on ionosphere, USSR also plans flights to Mars and Venus. Synthetically produced food, livestock farms, hothouses for oxygen will sustain the moon communities, which Reds say will be used as training camp for astronauts.

SPACE MAN WILL PROBABLY LOSE WEIGHT ON TRIP

Restricted environment cuts food, water intake says recent issue of Nature, British mag. Study by 2 English scientists showed restricted environment, such as sealed-in space travelers will face, cut food consumption by 25%, water intake by 12% to 15% in experiments conducted with group of rats over 6-month period. ///Science NsLttr/

NATO MISSILE PLANS

Nbr of missile-equipped battalions in NATO's Eur Cmd has reached 30. Under present plans 100 are expected by 1963. ///NATO/



PORTABLE BEACON WITH 5-MI RANGE DVLPD FOR AIRBRN ASSEMBLY

Lightweight, air-droppable pathfinder beacon dvlpd by Ft Belvoir Army Engrs to mark airbrn assembly points: 2-mi infrared range, 5-mi visible range, automatic pre-coded sys with 6 signal lenses. Contains 12-volt battery, weighs 20 lb in 30-in. carrying case, extends 23 ft.///Army Engrs/

WORLD-WIDE TRACKING NETWORK PLANNED; INTERIM SYS BEGUN

Primary stations are now being started for ARPA-NASA world-wide space-vehicle tracking network. The $10-million proj will follow launchings in polar orbits, Cape Canaveral launchings, shallow equatorial orbits and deep space probs. Long-range plans now in process.///Elec News/

THERMOELECTRIC GENERATOR RECEIVES STUDY AT NOL

Hi-efficiency generator to convert heat directly into elec energy is under study at Naval Ord Lab. Present problem with Thermoelectric Generator (TEG) is finding semiconductor matls which have max efficiency for converting thermal energy into elec energy. ///NOL 02-5/

NATO TROPO SCATTER RADIO SYS

First operational links of new and modern tropospheric scatter com sys have been turned over to control of SHAPE. Four stations at Oslo, Trondheim, Mosjoen and Bode—all in Norway—are 1st of planned group of Tropo scatter sys that will permit rapid and efficient communications between SHAPE and various subordinate hqs from Norway to Turkey. In Tropo scatter, transmish is beamed at troposphere which bounces sig back down to distant sta. Range of 1300 mi is possible with tropo scat.///NATO 4-7/

MINIATURE DEVICES DVLPD BY ARMY ORD

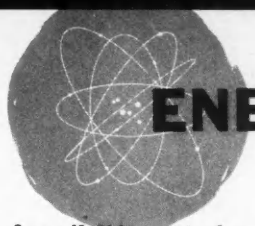
Dvlpmt of an electric light slightly larger than a pinhead and a radio transmitter the size of a pencil eraser was announced 2 Apr by Dept of Army. Both devices were dvlpd by Diamond Ord Fuze Labs of Washington, D.C., and rcvd natl awards for achievement in field of miniaturization.///Army/

PROFESSOR-STUDENT TEAM CONSTRUCTING UNIQUE NSF TELESCOPE

Team of 10 students directed by Dr John D. Kraus of Ohio State Univ is constructing unique radio telescope under Natl Sci Foundtn grant of $166,000. Two earlier grants by NSF on this proj have totaled $106,000.

USSR RELEASES INFO ON LUNIK I TRIP

Lunik I left earth Jan 2 at 7 mps, reached aphèlion in Sept at 5589 mph; the 3245.2-lb rocket contains 3 transmitters (1 on low-freq for tracking, 2 transmitting instrument readings). Experiments included measurements of: (1) moon's magnetic field (2) cosmic-radiation intensity and its photon density (3) heavy nuclei in cosmic radiation (4) corpuscular solar radiation (5) gaseous components of space (6) moon's radioactivity (7) meteoric particles (8) inside and outside temps of probe.///Astronautics/



HUSH-HUSH "PROJECT ORION" DISCLOSED

General Dynamics revealed for the 1st time its feasibility-study contract with ARPA as "Project Orion," a new concept of a 1,000-ton space platform propelled by controlled nuclr explosions. ///Gen Dyn 0459/

A-ENERGY CONVERTED TO ELECTRICITY

AEC successfully demonstrated the plasma thermocouple, a light, compact unit which produces elec from atomic energy. Described as "the breakthrough needed for interplanetary travel," the unit will have innumerable uses in all types of mil equip. ///WP&TH 0459/

AEC CONSIDERS PROPOSAL FOR FAST BREEDER REACTOR

AEC has selected GE's proposal for R&D and design of fast breeder reactor using oxide fuel cycle. Objective of the cost-type contract is to lower elec-pwr cost from fast breeder reactor pwr stations.///AEC B-53/

BETATRON GETS FIRST MISSILE APPLICATION

POLARIS solid propellant will undergo X-ray examinations at Allegany Ballistics Lab, with new 25,000,000-volt betatron, mfgd by Allis-Chalmers Mfg Co. This is the betatron's 1st missile application.///DOD 405-59/

LUMINESCENCE REMOVED FROM GLOW-IN-DARK FISH

For the 1st time scientists have removed luciferin from a fish. Luciferin is a light-emitting compound found in some "glow-in-the-dark" creatures, such as fireflies and glowworms. Working in Japan with lucifern from a South Seas fish known as kinme modoki, Dr Frank H. Johnson of Princeton and Dr Yata Haneda of the Tokyo Jikeika Medical College were able to mix 2 compounds that produce luminescence and get a luminescent reaction. The luminescent extracts are the enzyme luciferase and a substance known as luciferin which, upon decomposing, emits light. Research may lead to better anti-collision paints for aircraft. ///Science NsLttr/

ESSO NUCLR-POWERED TANKER PROPOSAL STILL PENDING

Esso Standard Oil Co still hopes govt will coop in constr of nuclr-pwrd tanker, with Esso carrying cost of conventional tanker, govt paying for nuclr-pwr application. ///DATA/

GIANT MISSILE SHELTER DVLPD BY ARMY

A hemispherically-shaped missile maintenance shelter 13 ft taller than Pentagon, as broad at its base as $\frac{1}{2}$ a football field & supported by air pressure, has been dvlpd by Army to accommodate missiles during inspection and maintenance ops. Called the Pentadome, giant 85-ft-hi shelter is believed to be largest air-supported structure ever built for military use. Dvlpd by Army Qm & Army Ord, contractor is Birdair Structures.///Army Qm 4-1/

SHIPS

NAVY COMMISSIONS TWO 15-KNOT WOODEN HULLED MINESWEEPS

Two wood-hulled, nonmagnetic minesweepers, the ABILITY class ASSURANCE and the AGILE class AFFRAY, have recently been commissioned by Navy. The 963-ton ASSURANCE is the 3rd and last vessel in her class, the other 2 being the ABILITY and the ALACRITY. AFFRAY is 165 ft long and displaces 750 tons fully loaded. Both ships have top speeds of abt 15 knts & are equipped with controllable pitch props. Total of 100 AGILE class minesweeps are built or under constr for USN and MDAP. ///Navy Info 0405/

FIVE PROTOTYPE BOATS UNDER BUSHIPS PROCUREMENT

(1)Steel reconnaissance boat (36 ft, 300-hp diesel engine) for underwater demolition may replace the LCPR (2)Bomb target boat (54 ft, two 600-hsp diesels) will tow a/c targets, may standardize target-towing boats (3) A noise-measuring boat (50 ft, 250-hp diesel) will detect noise from subs (4)Plastic utility boat (50 ft, 165-hp diesel) can be used as minesweep or to transport men or cargo (5)Fiberglass-reinforced plastic utility boat (26 ft, 50-hp diesel) will transport men and cargo. ///BuShips Jour 0235/

ALUMINUM RAFT

An aluminum raft that can be erected manually in 15 min has been dvlpd for use in ferrying lightweight combat vehicles across rivers and streams. The raft, utilizing half-pontoons joined at their sterns, is capable of carrying a 12-ton load in currents as swift as 5 mph. All components of the ferry can be carried on a $2\frac{1}{2}$-ton truck and pole type trailer.///Mil Prog/

CIVIL SERVICE A/C CARRIERS

Two civil service-manned utility a/c carriers, CROATAN and BRETON, have joined the Atlantic & Pacific Fleets respectively. The vessels each displace 9800 tons and are 512 ft long with 65-ft beams. These vessels, which have been serving as helicopter carriers, will be used for ferrying a/c to the fleets, and will not function in operational combat. They are manned by civ crews of 13 officers and 62 men each.///MSTS 4-9/

PLASTIC LIFEBOAT

Plastic lifeboat has passed severe tests and has been approved by US Coast Guard for installation on US-registered cargo & passenger vessels. Rigorous tests given plastic boat included being swung against a steel bulkhead while loaded with abt 4 tons of sand bags, and a free drop of 10 ft into water while fully loaded. Plastic boat passed all tests. It is 24 ft long and 8 ft wide with capacity of 40 persons. Stem and stern are of aluminum. Rest of boat is all plastic. ///USCG 0401/

CHINESE REDS ANNOUNCE LAUNCHING

ChiCom's 1st ocean-going freighter (the Leap Forward), with 13,400-ton loading capacity and 22,100-ton displacement, was launched recently. ///Mil Progress/

ORDNANCE

NAVY IMPROVES ITS CULINARY ART

A safe deep-fat fryer and advanced bread-baking process are recent innovations in Navy's shipboard kitchen. The 'Bayonne bread formula' eliminates extra time and equip, produces a more nutritious loaf; the 'immersion element' in frying uses small quant of fat, prevents splattering, and allows larger capacity and production. ///DATA/

SEMIAUTOMATIC RIFLES

Army will issue new M14 rifle in semiautomatic version only. Unit armorers will be given the parts to convert the rifle to selective automatic-semiautomatic as necessary. The M15, heavy barreled version of the weapon which is equipped with a bipod and designed to replace the BAR, will be issued with selector switch installed. ///Mil Progress 381/

HELMET DESIGN

US Naval Medical Field Res Lab has just completed special study on mil helmet design. Their report includes history of helmet dvlpmt, study of design theory of protective headgear, and complete bibliography on the subject. It also presents carefully thought-out conclusions and recommendations as to the shape and material which should be considered in future research and dvlpmt of helmets. ///Mil Progress 0382/

NEW TANK FOR MARINES, 60-TON M103A1

The 60-ton M103A1 tank is planned for use by elements of USMC. Main armament is 120-mm hi velocity gun, largest weapon ever mounted on a US tank and considered a match for any other tank gun in the world. Other armament consists of 30-cal machine guns firing coaxially with the 120-mm turret gun and a .50-cal machine gun mounted on top of turret. All guns are capable of firing from within tank. Vehicle carries 5-man crew and is controlled by a steering wheel and column gearshift similar to that in automobiles having automatic transmissions. ///Mil Progress 0381/

ICBM SITES ANNOUNCED

AF has announced 3 additional sites for launching ICBMs. They are: Ellsworth AFB, S. Dak.; Mountain Home AFB, Idaho; and Schilling AFB, Kans. First 2 are for TITAN, Schilling planned for ATLAS.///AF Info/

AF ADOPTS ARMY WORK UNIFORM

AF has officially adopted Army's fatigue uniform as an effort in support of interservice supply standardization. The action is expected to result in an annual saving of over $3 million. ///AF Info 0401/

ARMY AWARDS CONTRACT FOR M-60 MACHINE GUN

A $2,700,000 contract went to Saco-Lowell Shops for 1st commerical production of new 7.62mm M-60 machine gun, which will replace the 3 existing .30-caliber machine guns. ///DOD 400-59/

GOVT R&D FUNDS INCREASE $300 MILLION IN FY60

Request for new funds and estimated direct obligations for Defense Dept research, dvlpmt, test & eval program in FY60 will amount to $5.6 billion each, an increase of $300 million over FY59. ///AIA 0331/

LARGEST EARTHMOVER HAS MOTORS ON INDIVIDUAL WHEELS

New self-loading earthmover, said to be largest such device ever built, uses 'electric wheel' sys of propulsion. Machine, over 100 ft long, utilizes diesel pwr to drive elec generators. The elec pwr drives motors attached to the rim of each of the machine's 8 wheels. The 2 giant self-loading buckets of this gigantic earthmover can pick up 130-ton load of dirt, move it at speed of abt 16 mph, and spread it with even finish.///Mil Review 0401/

NYLON BEARINGS

An oilless suspension sys using special nylon bearings is being tested on an M48A1 tank. These bearings, which operate without grease, are hoped to be solution to problem of oiling bogey wheel torsion rods.///Mil Rev/

FLAMETHROWER KIT

New Army flamethrower kit under dvlpmt will be capable of selective mounting on variety of vehicles, converting them to effective mechanical flamethrowers. In experimental test, mounted on M59 personnel carrier, new flamethrower had effective range of 180 yds. ///Mil Review/

Submarine Warfare

FIRMS SPONSER ASW PROJECTS; NAVY WANTS "IDEAS"

Several million dollars' worth of company-sponsered anti-sub warfare projects characterize ASW R&D today, while studies are underway for an Early Warning Sys counterpart, entailing massive ground installations at Atlantic gateways or a bathosphere refining. Some major firm-sponsered projects are: Sperry Gyroscope—automatic adaptive-flight control sys for 'copters (already sold to Swedish Navy for ASW work). Sperry is also said to be working on an automatic sub navigational computer; Mireda Hazeltine Corp—R&D on sonobuoys; Accoustics Assoc—end-fire sounds source for long-range sub detection. ///Elec News 32359/

LOCKHEED ESTABLISHES HI-LEVEL SUB WARFARE TECH ORGANIZATION

Lockheed A/C has disclosed estab of hi-level tech org to find solutions to enemy sub threats. According to Lockheed Pres Courtland Gross, "It would be rash to assume that the Russians are not now working on ballistic missile launching nuclear-powered submarines." Designated LAWSO (Lockheed Anti-sub Warfare Sys Org), new group will work with Navy to dvlp new techniques to neutralize sub menace. ///Lockheed 0401/

NAVY ANNOUNCES POLARIS-SUB LAUNCHING

1st in series of 10 fleet ballistic missile subs, the George Washington SSB (N)598 will be launched at Gen Dynamics 9 Jun. Designed as mobile underwater launching platform for POLARIS, the FBM sub is 380 ft, nuclr-pwrd, with torpedo-firing sys, inertial navigation sys, & vertical tubes for firing.

THE WASHINGTON REP REPORTS*

Question: What effect will the wide spread adoption of the weapons system concept have on industries engaged in Defense Contracting?

Mr. William E. Dobbins, Director of the Washington Office of DRESSER INDUSTRIES has been a Dresser executive for the past 15 years.

I believe the present weapons system concept, in view of its complexity, eliminates from the field all but the versatile, experienced qualified major manufacturers. Obviously the smaller manufacturers will have participation in a secondary role as sub-contractors which in itself is not at all handicapping. Rather, it should prove a boon to the smaller plants by enlarging the scope of their potential operations in this general field.

★ ★ ★

Mr. R. B. Swanson, Assistant to the Vice President and General Manager of the Washington Office of CONVAIR. Mr. Swanson has been a Convair Executive for the past 15 years and has been stationed in Washington for the past 12 years. He holds a law degree from Rutgers University.

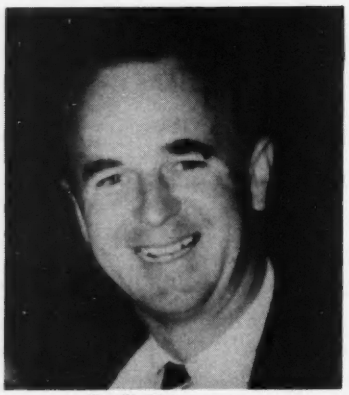
First of all, I'd like to set some people straight about this weapons system management concept. It's nothing new. The idea is that one activity quarterbacks the project, and in this regard the Air Force has used a weapons system management concept on their aircraft practically since the first Wright Brothers plane. However, until recently the Air Force has been the Weapons System Manager and they have done a pretty good job.

Now, because equipment has grown so complex, they need more specialized managers than the Air Force can provide. So they, and now the other services as well, have turned more and more to industry.

The effect will be to place the contractors with the most brain power and facilities in the Weapons System Manager seats. The smaller companies will still get plenty of business but will probably see more of the Defense dollar as a subcontractor rather than as a prime. There is no doubt that the weapons system management concept—where there is need for only a single major prime contractor to call signals—will cut down the number of primes, but from the overall

* DATA takes pleasure in bringing you a new inquiring reporter feature which will bring you the answers of key Washington manufacturers' representatives to pertinent questions concerning Government contracting.

William E. Dobbins
Dresser Industries



R. B. Swanson
Convair

George Wheat
Republic Aviation Corporation

Defense standpoint this is good. The country get better armament faster.

One last word, however, should be mentioned. The military services have a tremendous "in House" technical and management capability and it may well be that increased use of this talent for weapons system management might be in order.

★ ★ ★

Mr. George Wheat, manager of the Washington office of REPUBLIC AVIATION CORPORATION, joined Republic 17 years ago, in the fall of 1941, and has been assigned to the Washington office since December 1949. A graduate of the University of Virginia, Mr. Wheat served with the US Navy prior to joining Republic.

The weapons system concept imposes on industry a tremendous responsibility, in that it necessitates the coordination of all elements of a weapons system to arrive at a completely operational unit.

Initially, it will require time for industry to gain experience under this new system, but once that experience is gained the centralization of responsibility under the concept should result in a better product.

★ ★ ★

Colonel Harry A. Kuhn, USA (Ret.) is the Washington representative for ALLIED CHEMICALS and serves as the consultant for several other chemical companies. He holds degrees from Carnegie Institute, Ph.B., M.Sc. from the University of Wisconsin. He served in the Army Chemical Corps.

Well, it seems to me that this weapons system concept idea practically eliminates direct buying by the Government of any kind of chemicals—or other raw materials for that matter. It surely makes it difficult to plan on what may develop later to be short supplies of chemicals since the weapons system manager is certainly not going to buy more of a given chemical or other commodity than he needs to handle just the one job under consideration. I believe that the weapons system concept will cut down stockpiling of raw materials and will make it difficult to control allocation of critical materials.

★ ★ ★

Captain R. E. W. Harrison, USN (Ret.) is president of HARRISON ENGINEERING SERVICES which serves as Washington representatives and consultants for several Gov-

ernment contractors including INTERNATIONAL RESEARCH & DEVELOPMENT CORP., GLOBE INDUSTRIES, and PHILADELPHIA GEAR WORKS. Captain Harrison has had a distinguished career as an officer first for the British Army and then later becoming a US Navy Captain serving in the Washington area in the Bureau of Ships and Dept. of Commerce.

The weapons system concept can result in superior management in the procurement of completely integrated units adding up to a complete system which is more workable and reliable.

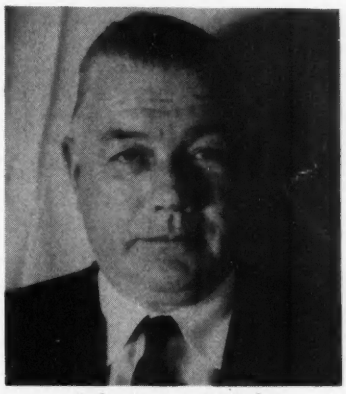
Under some methods of procurement where, say, a motor generator is required, several contractors would be involved —one to supply the motor, another the flexible coupling, another the generator, another the baseplate, and perhaps another contractor supplying the switch gear. No inspection system can be geared up to deal with such a *manufactured hazard*. But this scheme of procurement persisted because no one in authority took the trouble to rationalize it. The ultimate costs to the Government were, of course, higher than they would have been had the complete equipment been bought from one contractor—who would be at liberty to subcontract any part of the deal he wanted to—but he, as prime contractor, would have to accept complete and final responsibility for the motor generator as a whole.

All branches of the Armed Services will benefit by the careful selection of prime contractors who, to meet required delivery dates, will be compelled to select reliable subcontractors.

I believe the weapons system concept represents good management.

. . . a summary by DATA publisher Murray Smith

It seems from the "off-the-cuff" talk and the unmistakeable trends, that the weapons system concept means one clear-cut fact: *fewer prime contractors*. Face it, weapons have grown so complex that only the largest of our industrial firms can handle the whole theory, layout, R&D and test. Rather than subcontract, many of the large primes are starting their own subsidiaries to keep business in the family. Some of the medium-sized contractors are now banding together to make "team" presentations. From the Defense strength standpoint it is good, but from the small business standpoint, it will certainly reduce the amount of direct Defense dollars.



Col. Harry A. Kuhn
Allied Chemicals

Capt. Robert E. W. Harrison
Harrison Engineering Services

Murray Queen Smith
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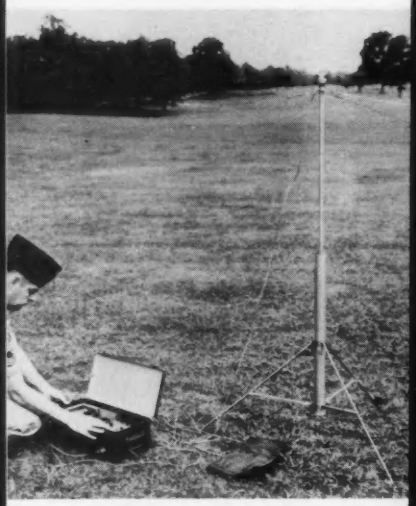
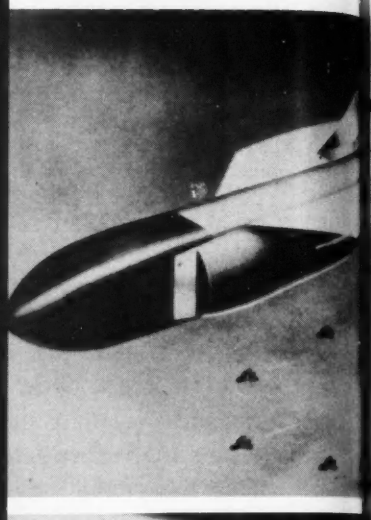
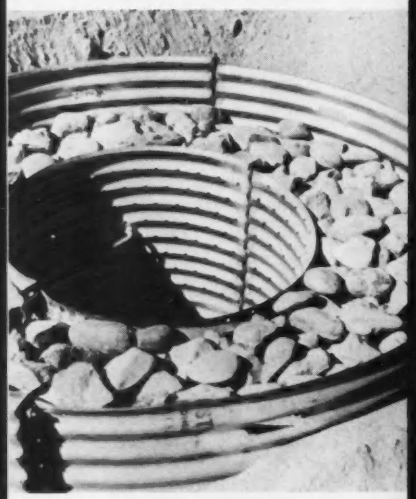
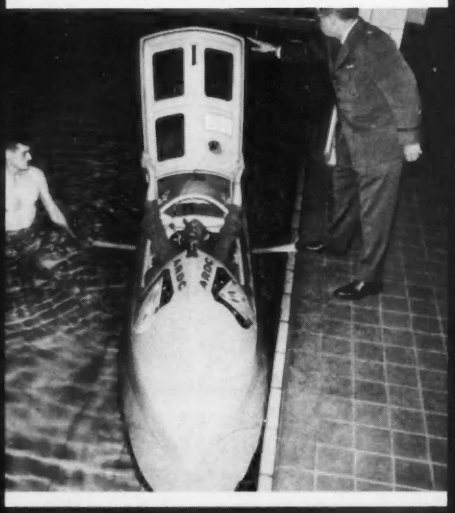
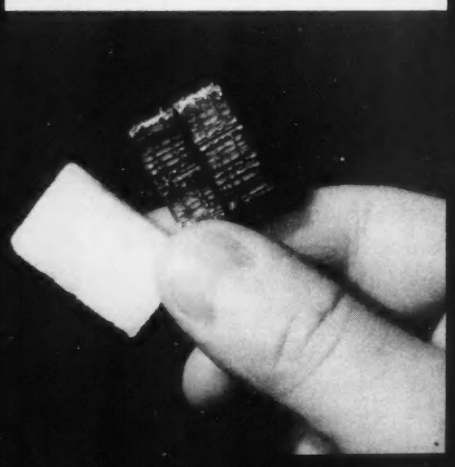
FROM DEPARTMENT OF DEFENSE











Now undergoing user tests at Ft. Bragg, N.C. is an air-droppable beacon light with a visible light range of five miles when viewed from 1,000 foot altitude and an infra-red range when viewed from the ground. Developed by the Army Engineer Corps for making assembly points for airborne troops, the pathfinder can be erected and operated by one man.

First in a new family of Army trucks, the XM410 has been successfully developed for the Department of the Army by the Chrysler Corp. The new *"intermediate duty"* truck will have an approximately 30 percent greater weight-carrying capacity and a 50 percent better fuel mileage than the present 2½ ton truck which the XM410 is expected to replace.

The Air Force GAM-72 "Quail", an air-launched diversionary missile was developed by McDonnel Aircraft Corporation for use by the Strategic Air Command. Equipped with various counter measures, "Quail" would be launched by B-47 or B-52 bombers upon approaching a target area.

A special underground shelter for protective use against atomic weapons effect is being tested by the Army Corps of Engineers. Rocks are placed around the tubes to a depth of 5 feet. The air supply is drawn from the atomosphere through a perforated cover and the rock bed into the entrance tubes through a number of small holes in the sides of the tubes. The blast arrestor is patterned after a Swedish design.

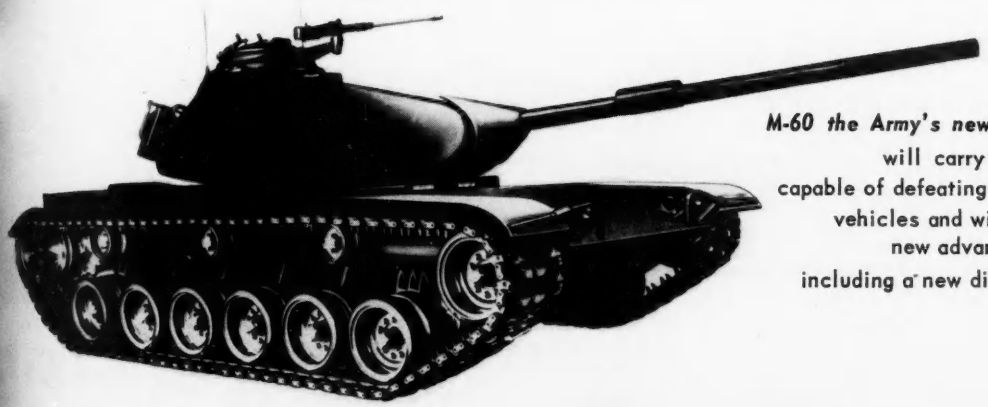
M/Sgt. George Post prepares to leave a research capsule in the Air Force's Wright Air Development Center Testing Pool, Dayton, Ohio after a three-day simulated lost-at sea test. The capsule is the latest in a series aimed at providing a detachable escape capsule for supersonic aircraft. This capsule would permit the pilot to escape in an inclosed capsule which contains all his necessary equipment.

Diamond Ordnance Fuze Laboratories has developed an electric light, one-tenth of an inch long and 35 one-hundredths of an inch in diameter which may be used in many types of dials such as those on control panels in missile research and electric computers. It also may be used in medical endoscopes, in scientific and industrial research, and in optical systems requiring a near-point source of light.

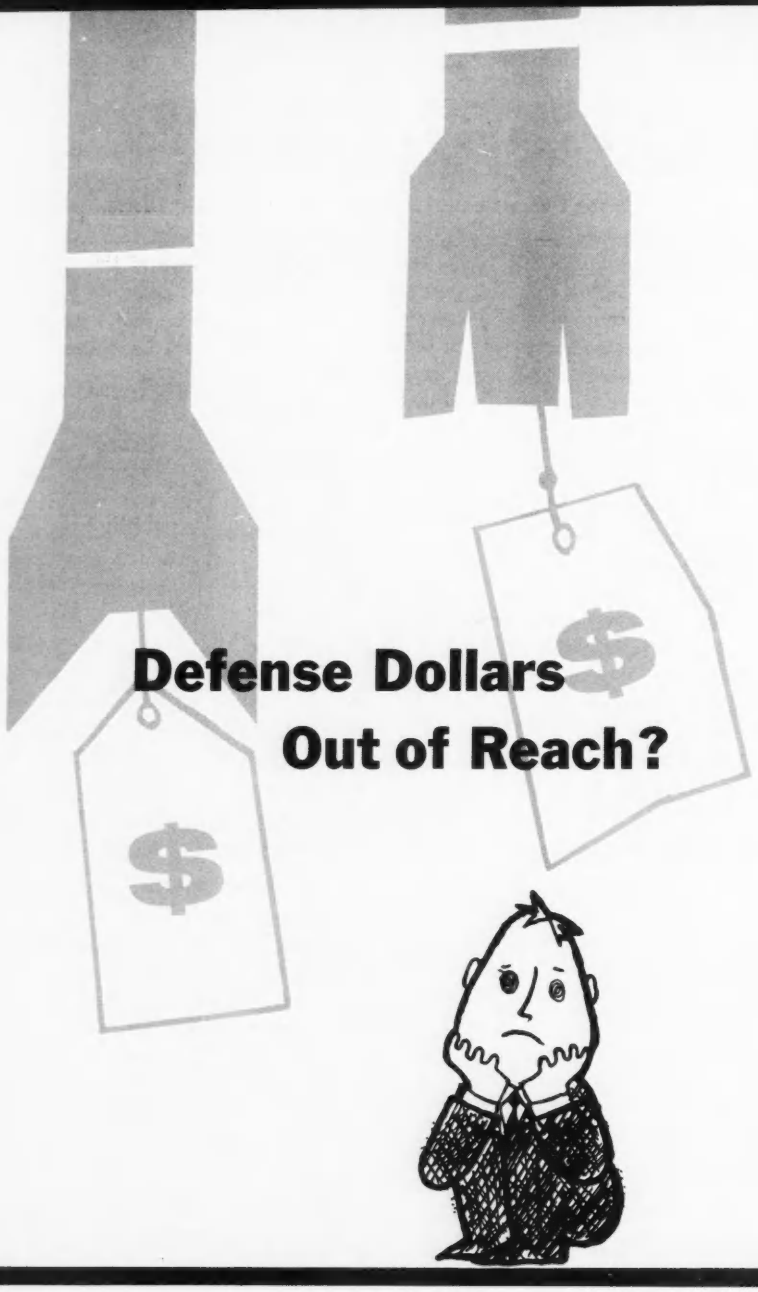
Any of three different cannons or a wrecker can be permanently mounted on a new carriage developed by the Army. The model is of lighter weight than previous carriages and provides increased range and cross-country mobility. Standardization of the carriage permits installation of a 175 mm gun, 155 mm gun, 8 inch howitzer or standard wrecker (175 mm gun in photo).

The electronics of this radio developed by the Army Signal Research and Development Laboratory and RCA as the prime contractor actually are slightly smaller than a lump of sugar. The receiver is made of micro-modules, building blocks which measure a third of an inch on each side and promise a size reduction of ten to one or better in electronic equipment.

A "flying saucer" used for air-dropping supplies of gasoline, water or liquid foods to small detachments of combat troops has been developed by the Quartermaster Corps. Fabricated of natural and synthetic rubber, this 25-gallon free-fall container is molded in two pieces, and consists of a round chamber or container with a flexible rim which keeps the entire object horizontal during its descent from plane to ground.



M-60 the Army's new battle tank will carry a new 105 mm gun capable of defeating all known armored vehicles and will contain new advanced components, including a new diesel engine.



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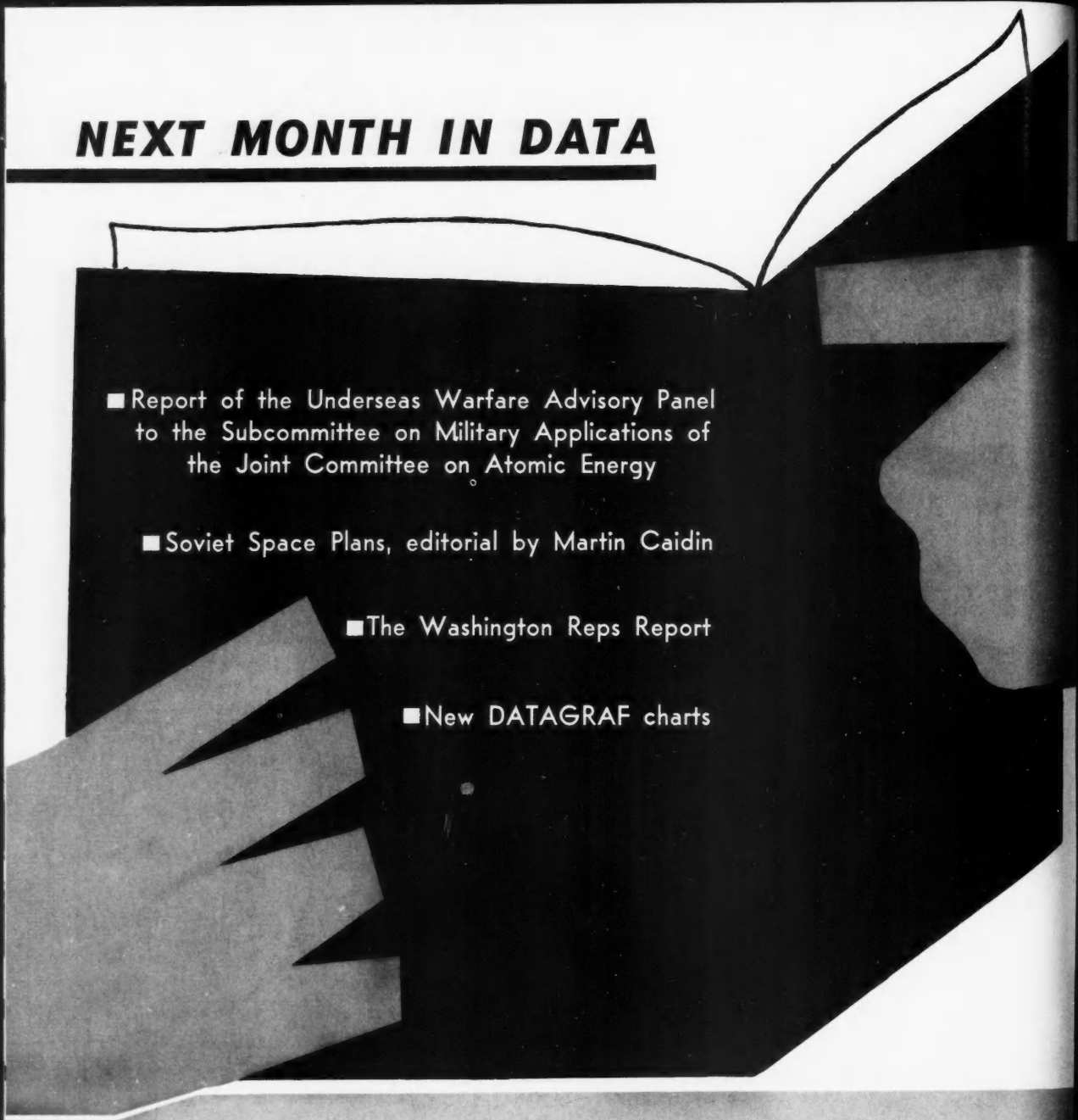

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